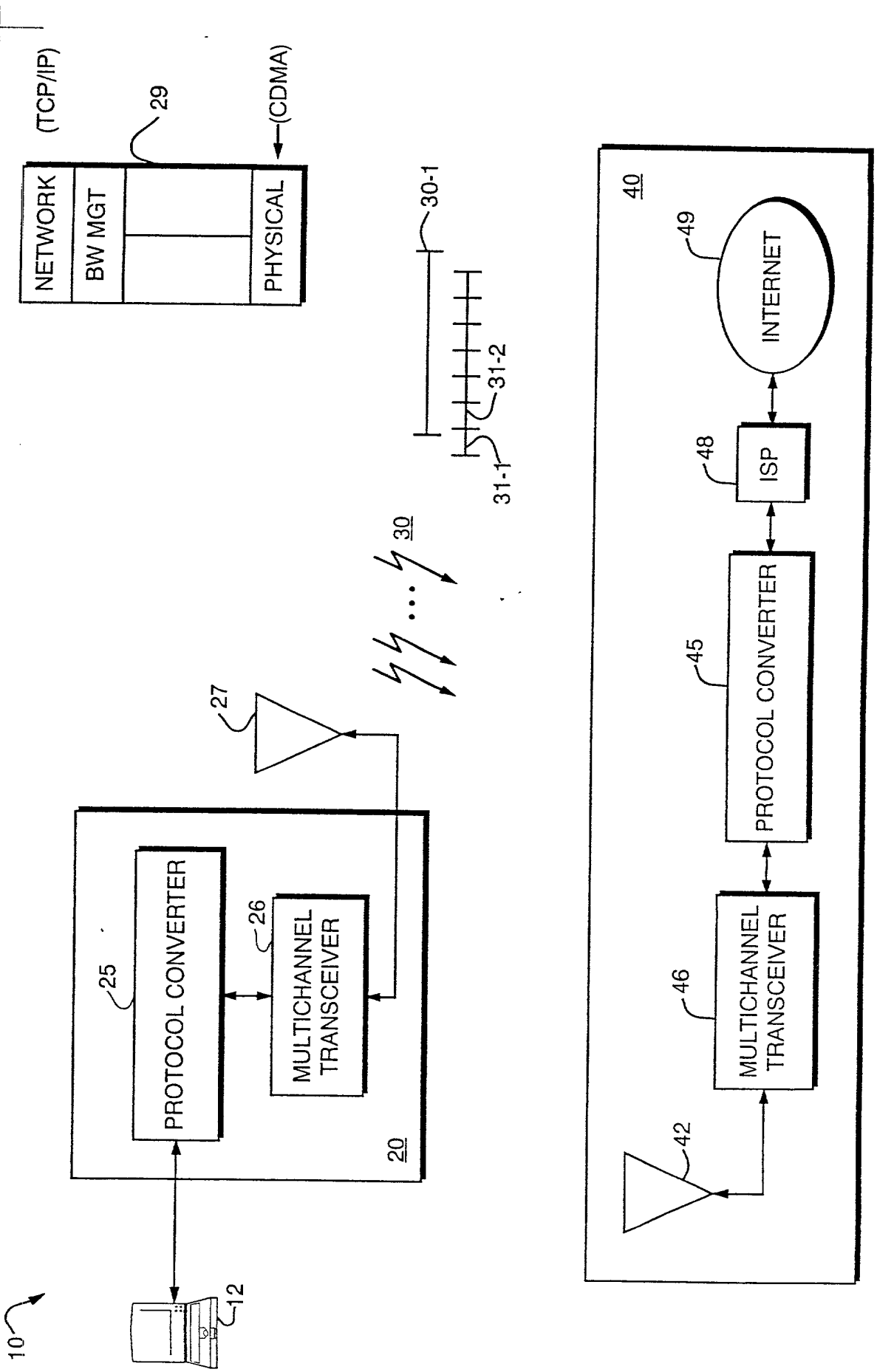

10
12
20
25
PROTOCOL CONVERTER
26
MULTICHANNEL TRANSCEIVER
27
30
30-1
31-1
31-2
29
NETWORK
BW MGT
PHYSICAL
(TCP/IP)
(CDMA)
40
42
46
MULTICHANNEL TRANSCEIVER
45
PROTOCOL CONVERTER
48
ISP
49
INTERNET

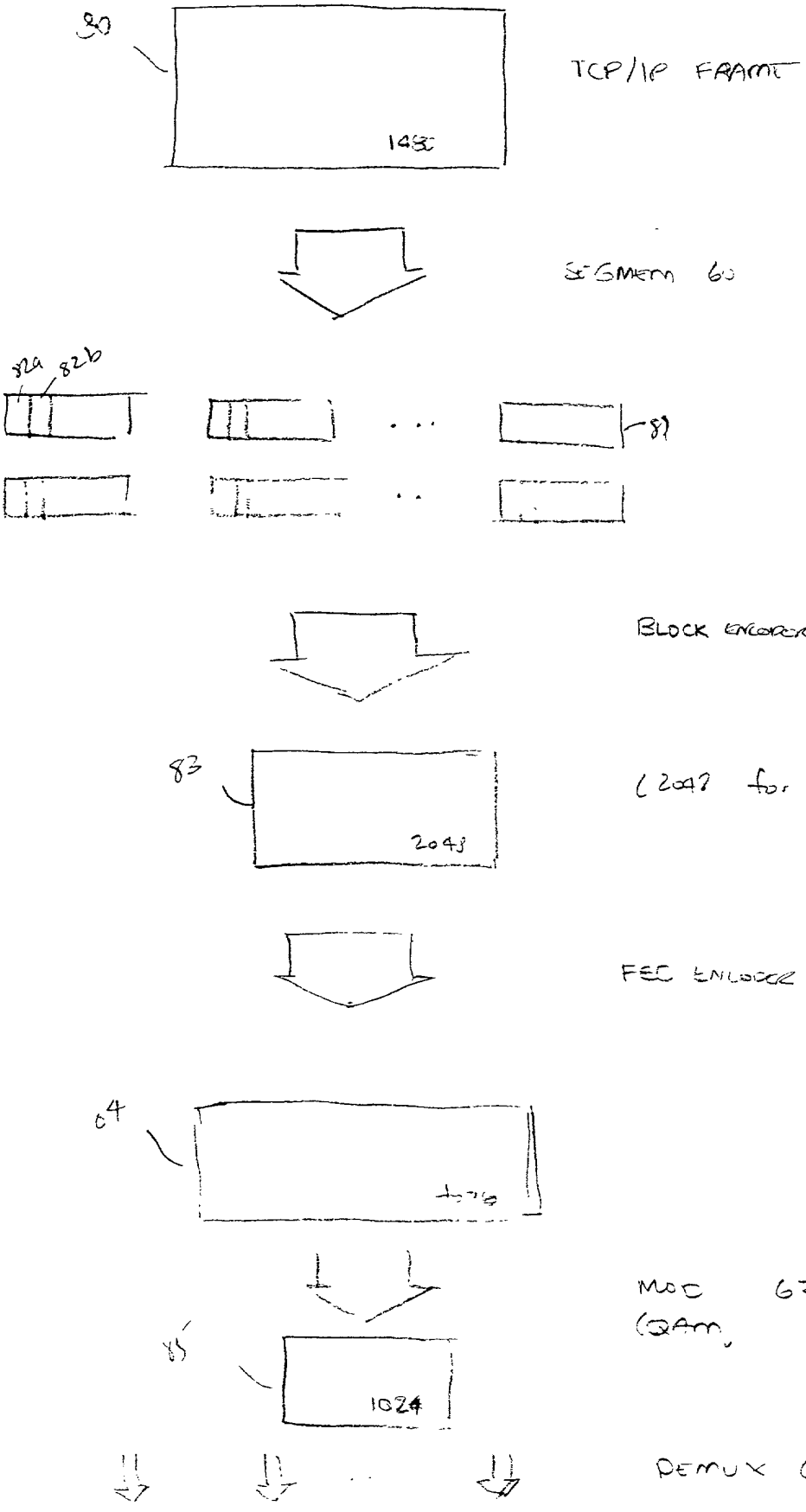
FIG. 1

FIG 2

data rate = chip rate · (# bits per symbol) · # code words per correlation · (information block size / full block size)

1.2288 MC chips/sec	QPSK: 2	2, ..., 28	$(\frac{1}{3}), (\frac{1}{2}), (\frac{4}{5})$ or $(\frac{1}{3}), (\frac{2}{3})$
	8PSK: 3		
	16QAM: 4		
	64QAM: 6		

FIG. 3


80
1456
TCP/IP FRAME
SEGMENT 60
82a
82b
81
BLOCK ENCODER 61
83
2048
(2048 for 1/2 - 4096)
FEC ENCODER 62
64
MOD 63 -
(QAM,
85
1024
DEMUX 64

Docket No.: 2479.2021-000
Title: Maximizing Data Rate by Adjusting....
Inventors: Hoffmann, *et al.*

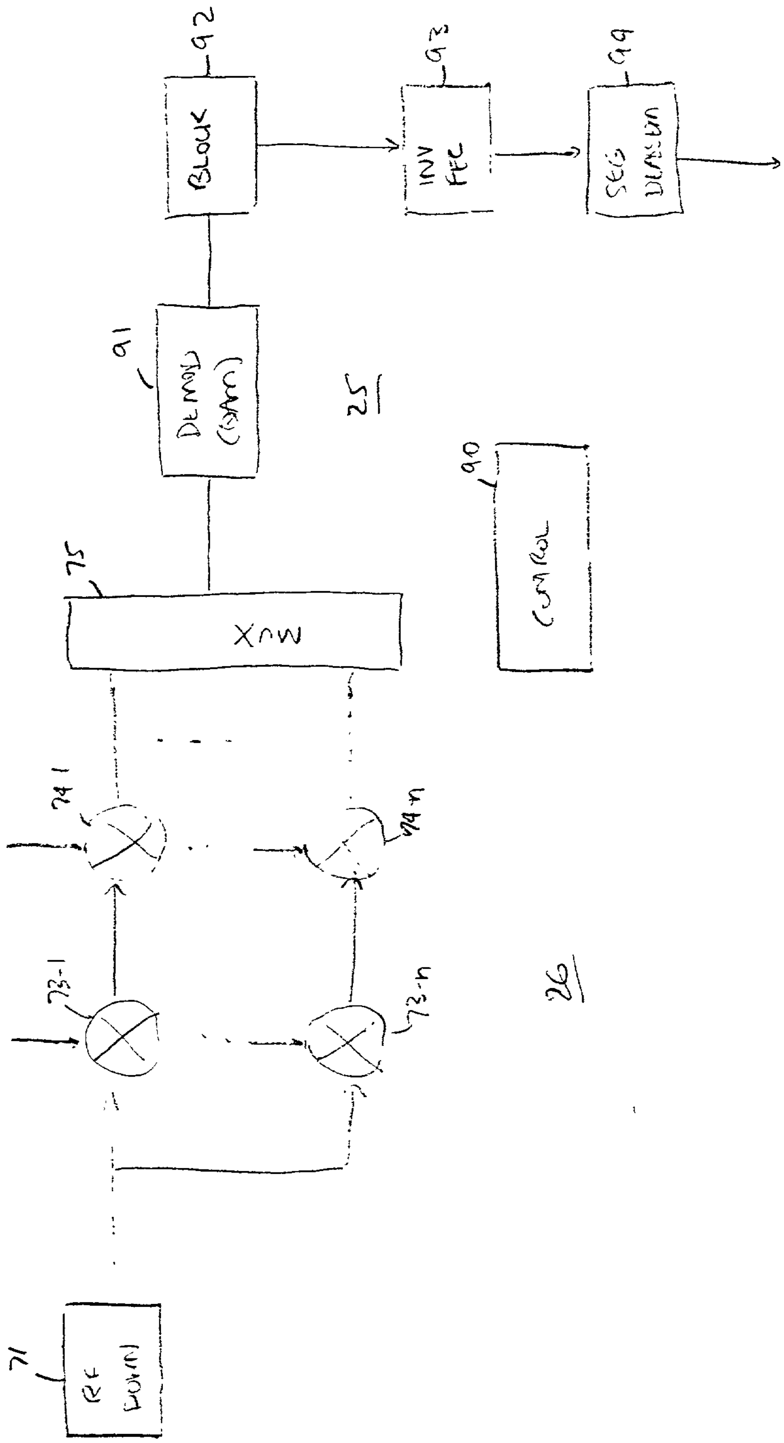


FIG. 4

Mod	64	64	64	16	16	16	8	8	8	4	4	4	
Info	3249	2048	1331	3249	2048	1331	3249	2048	1331	3249	2048	1331	
Size	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	
Channel Codes													
2	0.366	0.228	0.150	0.244	0.152	0.100	0.183	0.114	0.075	**0.122**	**0.076**	**0.050**	
4	0.731	0.456	0.299	0.487	0.304	0.200	0.366	0.228	0.150	**0.244**	**0.152**	**0.100**	
6	1.097	0.684	0.449	0.731	0.456	0.299	0.548	0.342	0.225	**0.366**	**0.228**	**0.150**	**I-CDMA**
8	1.462	0.913	0.599	0.975	0.608	0.399	0.731	0.456	0.299	0.487	0.304	0.200	
10	1.828	1.141	0.749	1.218	0.761	0.499	0.914	0.570	0.374	0.609	0.380	0.250	
12	2.193	1.369	0.898	1.462	0.913	0.599	1.097	0.684	0.449	0.731	0.456	0.299	
14	2.559	1.597	1.048	1.706	1.065	0.699	1.279	0.799	0.524	0.853	0.532	0.349	
16	2.924	1.825	1.198	1.949	1.217	0.799	1.462	0.913	0.599	0.975	0.608	0.399	
18	3.290	2.053	1.348	2.193	1.369	0.898	1.645	1.027	0.674	1.097	0.684	0.449	
20	3.655	2.282	1.497	2.437	1.521	0.998	1.828	1.141	0.749	1.218	0.761	0.499	
22	4.021	2.510	1.647	2.680	1.673	1.098	2.010	1.255	0.824	1.340	0.837	0.549	
24	4.386	2.738	1.797	2.924	1.825	1.198	2.193	1.369	0.898	1.462	0.913	0.599	
26	4.752	2.966	1.947	3.168	1.977	1.298	2.376	1.483	0.973	1.584	0.989	0.649	
28	5.117	3.194	2.096	3.411	2.129	1.398	2.559	1.597	1.048	1.706	1.065	0.699	

Table 1 - Theoretical Effective Information Bit Rate (Mbps) for 4096 Block Size

FIG. 5

Proposed 'I-CDMAximum' physical layer using various numbers of codes and code rates with 2048 block size.

Mod	64	64	64	16	16	16	8	8	8	4	4	4
Info	1482	858	684	1482	858	684	1482	858	684	1482	858	684
Size	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048
Codes												
2	0.333	0.193	0.154	0.222	0.129	0.103	0.167	0.097	0.077	0.111	0.064	0.051
4	0.667	0.386	0.308	0.445	0.257	0.205	0.333	0.193	0.154	0.222	0.129	0.103
6	1.000	0.579	0.462	0.667	0.386	0.308	0.500	0.290	0.231	0.333	0.193	0.154
8	1.334	0.772	0.616	0.889	0.515	0.410	0.667	0.386	0.308	0.445	0.257	0.205
10	1.667	0.965	0.770	1.112	0.644	0.513	0.834	0.483	0.385	0.556	0.322	0.257
12	2.001	1.158	0.923	1.334	0.772	0.616	1.000	0.579	0.462	0.667	0.386	0.308
14	2.334	1.351	1.077	1.556	0.901	0.718	1.167	0.676	0.539	0.778	0.450	0.359
16	2.668	1.544	1.231	1.778	1.030	0.821	1.334	0.772	0.616	0.889	0.515	0.410
18	3.001	1.737	1.385	2.001	1.158	0.923	1.501	0.869	0.693	1.000	0.579	0.462
20	3.335	1.931	1.539	2.223	1.287	1.026	1.667	0.965	0.770	1.112	0.644	0.513
22	3.668	2.124	1.693	2.445	1.416	1.129	1.834	1.062	0.846	1.223	0.708	0.564
24	4.001	2.317	1.847	2.668	1.544	1.231	2.001	1.158	0.923	1.334	0.772	0.616
26	4.335	2.510	2.001	2.890	1.673	1.334	2.167	1.255	1.000	1.445	0.837	0.667
28	4.668	2.703	2.155	3.112	1.802	1.436	2.334	1.351	1.077	1.556	0.901	0.718

- Theoretical Effective Information Bit Rate (Mbps) for 2048 Block Size

FIG 6

Proposed 'I-CDMAximum' physical layer using various numbers of codes and code rates with **1024** block size.

Mod	64	64	16	16	8	8	4	4
Info	676	363	676	363	676	363	676	363
Size	1024	1024	1024	1024	1024	1024	1024	1024
							2/3	1/3
Codes								
2	0.304	0.163	0.203	0.109	0.152	0.082	0.101	0.054
4	0.608	0.327	0.406	0.218	0.304	0.163	0.203	0.109
6	0.913	0.490	0.608	0.327	0.456	0.245	0.304	0.163
8	1.217	0.653	0.811	0.436	0.608	0.327	0.406	0.218
10	1.521	0.817	1.014	0.545	0.761	0.408	0.507	0.272
12	1.825	0.980	1.217	0.653	0.913	0.490	0.608	0.327
14	2.129	1.143	1.420	0.762	1.065	0.572	0.710	0.381
16	2.434	1.307	1.622	0.871	1.217	0.653	0.811	0.436
18	2.738	1.470	1.825	0.980	1.369	0.735	0.913	0.490
20	3.042	1.634	2.028	1.089	1.521	0.817	1.014	0.545
22	3.346	1.797	2.231	1.198	1.673	0.898	1.115	0.599
24	3.650	1.960	2.434	1.307	1.825	0.980	1.217	0.653
26	3.955	2.124	2.636	1.416	1.977	1.062	1.318	0.708
28	4.259	2.287	2.839	1.525	2.129	1.143	1.420	0.762

(NO 4/5 CODING FOR SCL)

Theoretical Effective Information Bit Rate (Mbps) for 1024 Block Size

FIG. 7